

1/3

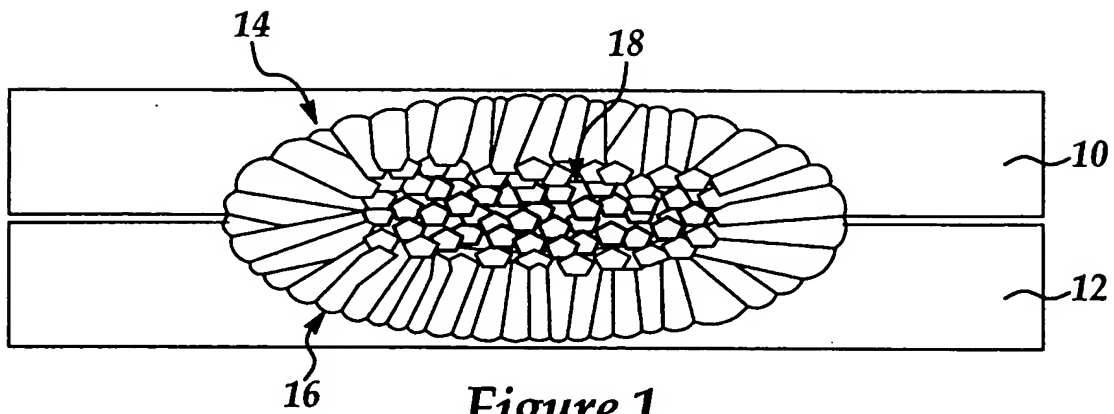


Figure 1  
Prior Art

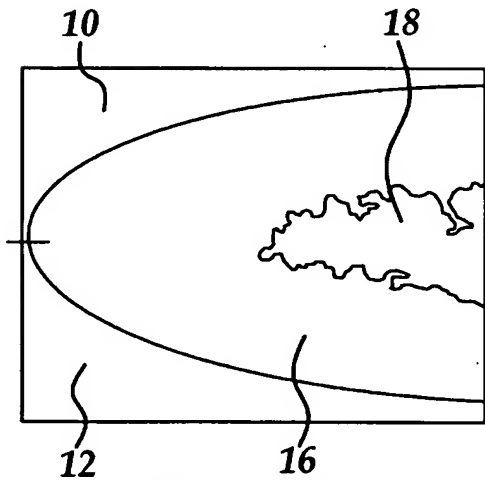


Figure 2  
Prior Art

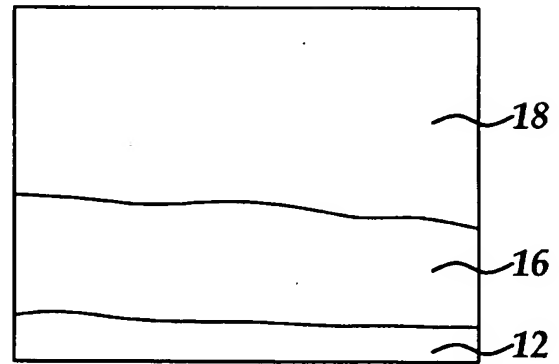


Figure 3  
Prior Art

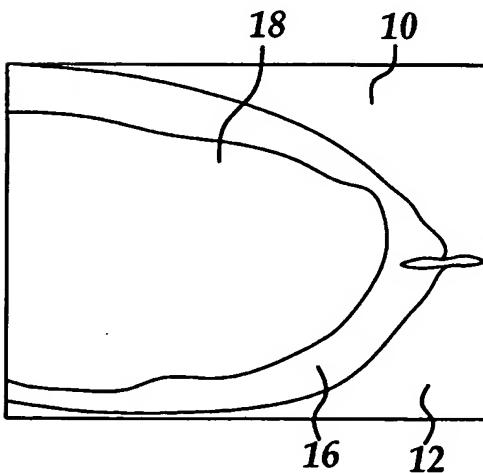


Figure 4

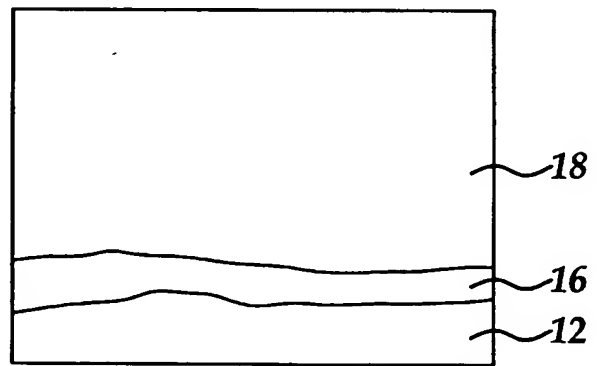
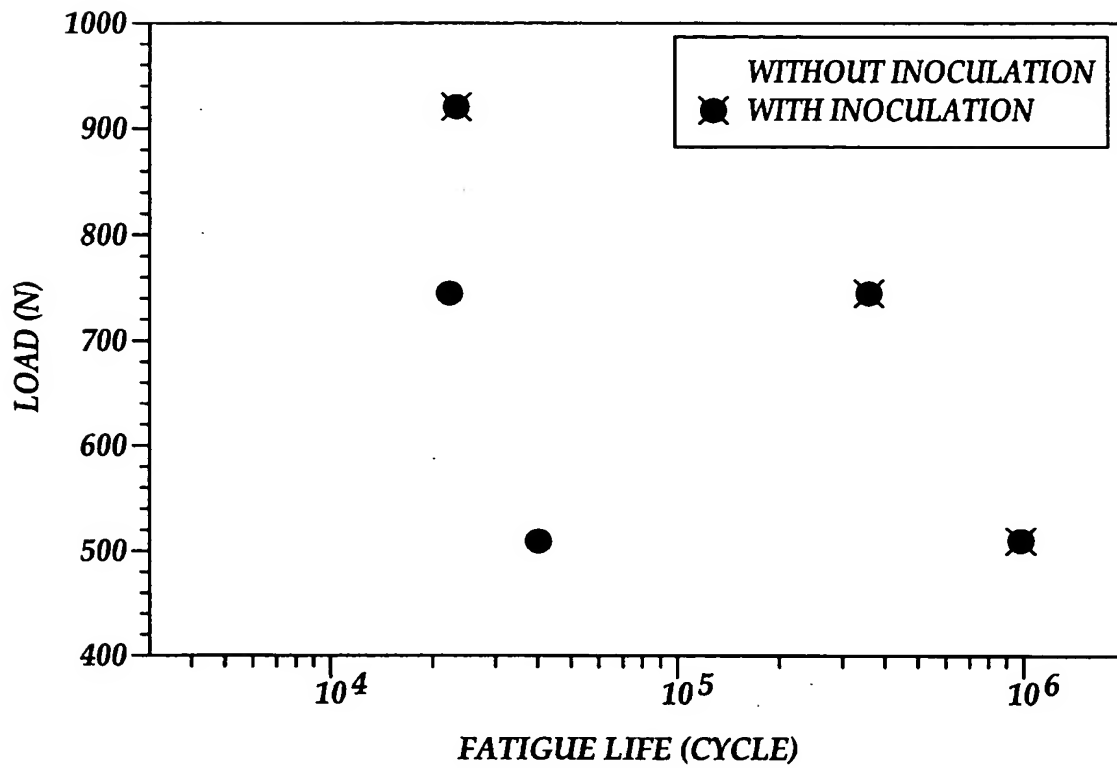


Figure 5

2/3



**Figure 6**

The sorts of inoculation	The specimens No.	Welding parameters						Mechanical properties					
		Welding current I <sub>w</sub> /kA			Welding time t <sub>w</sub> /s	Welding force F <sub>1</sub> /N	Forging force F <sub>2</sub> /N	Tensile shear load F <sub>T</sub> /N	Tensile shear load range (N)	Average tensile shear load (N)	The bias (%)	Improvement (%)	Fracture type
NO	501	18.7	18.7	18.74	0.14	3000	7000	2822	2822	2877.8	-1.94	/	tore
	502	18.7	~					2906	~	~	~		
	503	18.7	18.8					2920	2920	+1.47			
	504	18.8											
	505	18.8						2910					
								2831					
Al-Ti5B1RE1	511	20.3	20.3	20.34	0.18	3000	7000	3250	3250	3451.8	-5.85	19.95	
	512	20.3	~					3597	~	~	~		
	513	20.4	20.4					3508	3597	+6.56			
	514	20.4						3452					
Al-Ti3C 0.15	521	20.3	20.3	20.5	0.18	3000	7000	3015	2985	3254.5	-7.36	13.09	
	522	20.5	~					3471	~		~		
	523	20.5	20.7					3547	3547		+8.99		
	524	20.7						2985					

**Figure 7**

3/3

Dead load <input type="checkbox"/> N <input type="checkbox"/>	Max dynamic load (N)	Cicles without inoculations	Cicles with inoculations	Improvement (%)
1370	920	$2.25 \times 10^3$	$2.9 \times 10^3$	28.9
1370	745	$6.5 \times 10^3$	$1.7 \times 10^4$	161.5
1370	510	$3.19 \times 10^4$	$8.7 \times 10^4$	172.7
1370	385	$1.29 \times 10^5$	$0.99 \times 10^6$ , not break	—

**Figure 8**

The sorts of inoculation	The specimens No.	Welding parameters						Mechanical properties					
		Welding current Iw/kA			Welding time tw/s	Welding force F <sub>1</sub> /N	Forging force F <sub>2</sub> /N	Tensile shear load F <sub>T</sub> /N	Tensile shear load range (N)	Average tensile shear load (N)	The bias (%)	Improvement (%)	Fracture type
NO	601	20.9	20.9	20.94	0.22	2100	5600	2255	1471	1840.2	-20.06	~	ripped
	602	20.9						1471					
	603	20.9						1635					
	604	21.0						2169					
	605	21.0						1671					
AITi5B1RE1	611	23.0	23.0	23.05	0.22	2100	5600	2673	2335	2496	-6.45	35.64	
	612	23.1	~					2335	~		~		
	613	23.1	23.1					2344	2673		+7.09		
	614	23.1	2632										
AITi3C 0.15	621	23.1	23.1	23.25	0.22	2100	5600	2627	2655	2730	-2.75	49.98	
	622	23.2	~					2813	~		~		
	623	23.2	23.5					2665	2813		+3.0		
	624	23.5						2776					
AISr10	631	23.1	23.1	23.1	0.22	2100	5600	3008	2464	2856.8	-13.75	55.24	tore
	632	23.1						2464	~		~		
	633	23.1						2972	3008		+5.29		
	634	23.1						2983					

**Figure 9**

Dead load <input type="checkbox"/> N <input type="checkbox"/>	Max dynamic load (N)	Cicles without inoculations	Cicles with inoculations	Improvement (%)
1370	920	Break immediately after start	$1.75 \times 10^3$	—
1370	745	$1.35 \times 10^3$	$3.9 \times 10^4$	2788.9
1370	510	$1.215 \times 10^4$	$1.725 \times 10^5$	1319.8
1370	385	$2.67 \times 10^5$	$3.6 \times 10^5$	34.8
1370	270	$4.05 \times 10^5$	$0.9 \times 10^6$ , not break	—

**Figure 10**